

Remarks

By the foregoing amendments, claims 1, 6, 11, 14, and 15 are amended. Applicants respectfully submit that no new matter was added by the amendment, as all of the amended matter was either previously illustrated or described in the drawings, written specification, and/or claims of the present application. Entry of the amendment and favorable consideration thereof is earnestly requested.

Claim Rejections – 35 U.S.C. § 112

Claim 14 has been rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner stated that the clause “wherein the light-sensitive elements are illuminated only when image signals read-out during consecutive third time intervals differ by more than a second threshold value” is unclear. Applicants have amended this portion of claim 14 to read: “wherein the light-sensitive elements are illuminated only when the brightness of image signals read-out during consecutive time intervals differs by more than a first threshold value.” Support for these amendments is found in at least paragraphs [0036] and [0069]. No new matter has been added.

Applicants acknowledge and appreciate the indication by the Examiner on page 9 of the Office Action of October 18, 2007 that claim 14 would be allowable if amended to overcome the rejections under 35 U.S.C. § 112. Applicants respectfully submit that these § 112 rejections are overcome by the foregoing amendments to claim 14, and that claim 14 is in condition for allowance.

Claim Rejections – 35 U.S.C. § 103

Claims 1-5, 7-12, and 15-19 have been rejected under 35 U.S.C. § 103 as being unpatentable over He et al. (US 6,355,965) in view of Yamaguchi et al. (US 6,240,252).

Claim 6 has been rejected under 35 U.S.C. § 103 as being unpatentable over He et al. in view of Meek et al. (US 6,741,286). Applicants respectfully submit that these claims are patentable over the cited references in light of the foregoing amendments and the following remarks.

Applicants have amended claims 1, 6, 11, 14, and 15, all of the independent claims in the present application, to clarify the claimed invention. Specifically, all of these claims have been amended to recite that the light source in the vicinity of the images cells is adapted to illuminate the image cells without directly illuminating a scene to be recorded. Support for these amendments is present in at least paragraph [0016] of the specification. No new matter has been added.

Accordingly, claim 1 now recites a camera module for electronically recording images, the module comprising an image sensor having a plurality of image cells, wherein each image cell is adapted to provide an electric image signal as a function of incident light, and each image cell has a light-sensitive element for generating a light-dependent current. The module also comprises at least one MOS transistor having a gate terminal and a source-drain path and is arranged in series with the light-sensitive element. The gate of the transistor being at a fixed potential and the source-drain path being flowed through by the light-dependent current. The module further comprises at least one light source arranged in a vicinity of the image sensor, wherein the light source is adapted to illuminate the image cells without directly illuminating a scene to be recorded and is configured to illuminate the light-sensitive elements whenever a predefined basic brightness exceeds a first threshold value. Claims 6, 11, 14 and 15 each also recite the element of a light source in the vicinity of the image sensor, adapted to illuminate the image sensor without directly illuminating a scene to be recorded.

Applicants respectfully submit that none of the cited references, nor any combination of the cited references, contains each and every element of the claims. No

reference discloses a camera module that includes a light source in the vicinity of the image sensor that is adapted to illuminate the image sensor without directly illuminating a scene to be recorded. Thus, no combination of the cited reference would result in the claimed invention. Furthermore, there is no teaching in any of the cited references that would motivate one of ordinary skill in the art to modify the devices disclosed in the prior art to include such a light source.

He et al. discloses an improved pixel structure for a logarithmic response metal oxide semiconductor (MOS) image sensor. The circuit includes a photosensitive device. He et al. does not disclose, however, the use of a light source in the vicinity of the photosensitive device adapted to illuminate the photosensitive device without illuminating a scene to be recorded.

Yamaguchi et al. discloses a camera using conventional film (F) having a flash control apparatus. The camera includes a flash portion 40 for emitting light for illuminating the subject to be photographed and an auxiliary light module 24 for emitting automatic focusing auxiliary light. The auxiliary light module 24 is used to emit automatic focusing auxiliary light when there is at least one low-contrast distance measurement region, in order to aid the automatic focusing of the camera lens. Both the flash portion 40 and the auxiliary light module 24, however, emit light that directly illuminates the scene to be recorded by the camera, as the Examiner acknowledges on page 4 of the Office Action of October 18, 2007.

Meek et al. discloses an integrated camera and illumination device. The illumination device comprises a plurality of light emitting diodes arranged in a ring. The light emitting diodes are designed to provide direct illumination of the scene to be recorded by the camera, as the Examiner acknowledges on page 8 of the Office Action of October 18, 2007.

Thus, none of the cited references discloses a camera module comprising a light source for illuminating an image sensor without directly illuminating a scene to be recorded. Even if one of ordinary skill in the art were to combine these references, he or she would not obtain the claimed invention.

Furthermore, Applicants respectfully submit that one of ordinary skill in the art would never have been motivated to modify any of the prior art devices to include the feature of the claimed invention of a light source for illuminating an image sensor without directly illuminating a scene to be recorded.

First, none of the cited references contain any teaching or suggestion related to the problem of the “pulling effects” associated with some image cells when a light signal of high intensity quickly changes to a light signal of low intensity and, thus, none of the cited references contain any teaching or suggestion related to any solution to this problem. The “pulling effects” problem is described in detail in the specification of the present invention. The feature of the claimed invention of a light source for illuminating an image sensor without directly illuminating a scene to be recorded addresses this problem. Both He et al. and Meek et al. relate to camera modules that include CMOS sensors, but neither reference is concerned with, or even mentions, any “pulling effects” problem with the device. Yamaguchi et al. does not even relate to “digital” type cameras, as He et al. and Meek et al. do. Yamaguchi et al. relates to a design for a camera that utilizes traditional, photosensitive film F. Thus, it is not surprising that Yamaguchi et al. also does not even mention the problem of “pulling effects” which sometimes affects digital image cells. Thus, Applicants doubt that one of ordinary skill in the art would have looked to any of these references for a solution to the “pulling effects” problem.

Even if one of skill in the art looked to the cited references, none of them contain any suggestion or teaching that would motivate one of skill in the art to include a light source for illuminating the image sensor without directly illuminating the scene to be

recorded. Yamaguchi et al. would never suggest such a modification to one of ordinary skill in the art, since the deliberate illumination of the image sensor (the film F) would expose the film and ruin any picture to be recorded thereon. The shutter 13 of Yamaguchi et al. has the express purpose of preventing the film F from being exposed to illumination except from the scene to be recorded. One of ordinary skill in the art would never be motivated to make the required modifications based on Yamaguchi et al.

He et al. does not even mention a light source that is integral with the image sensor and would never have suggested the necessary modifications to one of ordinary skill in the art.

Meek et al. does include a light source, but this light source is encased in the device such that it is not possible for it to illuminate the image sensor without first illuminating a scene to be recorded. In fact, Meek et al. explicitly teaches that the light emitting diodes are to be encapsulated in an epoxy encapsulant 19. (Meek et al., col. 2 line 29 – col. 3 line 2; FIG. 2a). Meek et al. contains no teaching or suggestion to use the LEDs 17 to illuminate the image sensor without also directly illuminating the scene to be recorded.

Applicants also respectively submit that the use of a light source to illuminate the image sensor without directly illuminating the scene to be recorded would have been counterintuitive to one of ordinary skill in the art. This arrangement would have possibly required additional components, such as filters, to separate the radiation of the additional light source from radiation in the visible spectral region. This is an additional factor that would have led one of ordinary skill in the art away from the present invention.

In summary, none of the cited references contain the feature of a light source in the vicinity of the image sensor that is adapted to illuminate the image sensor without

directly illuminating the scene to be recorded. One of ordinary skill in the art simply would not have found any motivation in any of the references to include such a feature in a camera module. Applicants respectfully submit that the invention of the present claims is patentable over the cited references.

It is respectfully submitted that claims 1-12 and 14-19, all of the claims remaining in the application, are in order for allowance and early notice to that effect is respectfully requested.

Respectfully submitted,

April 10, 2008

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